

Welcome to the NPGS Crop Germplasm Committee Chairs Virtual Meeting

November 20, 2014

The meeting will begin at 1:30 pm EST

Logistics of AT&T Connect Meeting Room

Note features in the task bar at the top of the meeting room screen:

- ✓ Can ask question using the raised hand feature
- ✓ Can use emoticons to convey information

Note the view pane to the right of the screen:

- ✓ Can change size by dragging
- ✓ Can ask question by sending note to presenter or to all
- ✓ Lists the participants
- ✓ Can tell who is speaking by observing the microphone icon (in participant application only)

If using a desktop speaker phone, you may want to mute it to avoid disseminating background noise to all.

Speedy Introductions

State your name and employer/location
as I call the roll in alphabetical order of CGCs
(Alfalfa to Woody Landscape)



CGC Chair Best Practices

- ❖ Submit minutes after CGC meetings, or ensure secretary does.
- ❖ Ensure your membership rosters are up to date.
- ❖ Notify NGRL when Chair rotates to a new member.
- ❖ Notify NGRL as far in advance as possible of meeting dates.
- ❖ Spearhead the revision of Crop Vulnerability Statements
- ❖ Consider virtual technologies (such as this one) if having a difficult time arranging well attended in person meetings.
- ❖ Consider joint meetings with other CGCs based on natural alignments and/or meeting locations

CGC Resources

- ❖ NGRL can assist with telconferences and virtual meetings
- ❖ CGC pages on GRIN help archive and display CGC information, provides continuity for chairs and members
 - ❖ Meetings dates and locations
 - ❖ Membership rosters and email addresses
 - ❖ Meeting minutes
 - ❖ Descriptor lists and reports
 - ❖ Crop Vulnerability Statement template
- ❖ System-wide email lists for PGOC, Curators, Primaries, CGC Chairs

Economic Research Service Census of NPGS Users

- ❖ ERS is planning a survey of germplasm recipients for selected NPGS taxa in the 2009-2013 timeframe to quantify demand and utilization
- ❖ Beans, Barley, Corn, Cotton, Sorghum, Squash, Soybeans, Potatoes, Rice and Wheat
- ❖ Will use Survey Monkey to ask 13 questions
- ❖ Survey and methodology needs approval from Office of Management and Budget
- ❖ Hope to activate survey next spring
- ❖ I will keep applicable CGC Chairs informed so that you can help us encourage a high response rate

Thanks to you and your
committees for supporting
the U.S. National Plant
Germplasm System!

GRIN-Global for the NPGS

- Development team has selected a new date to convert from current GRIN for plants to GRIN-Global:

January 2-5, 2015

- Twice a week refresher training and Q&A sessions for NPGS genebank staff are underway
- The test public website remains available at <http://npgsweb.ars-grin.gov/gringlobal/Search.aspx>
It is fully functional but orders are not filled. Use current GRIN for “real” orders until the conversion
- Feedback email: feedback@ars-grin.gov

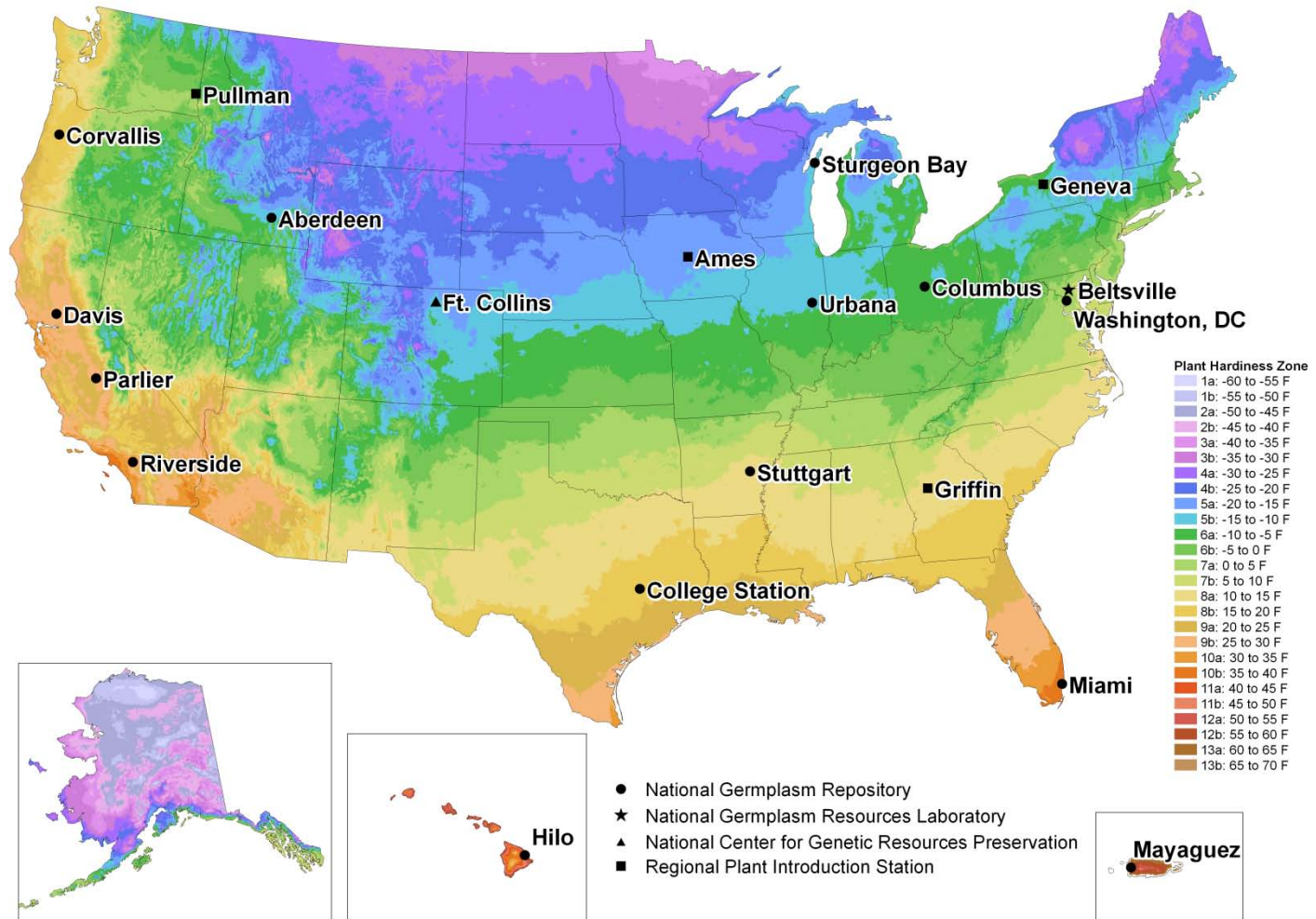


The National Plant Germplasm System: 2014 Status and Prospects

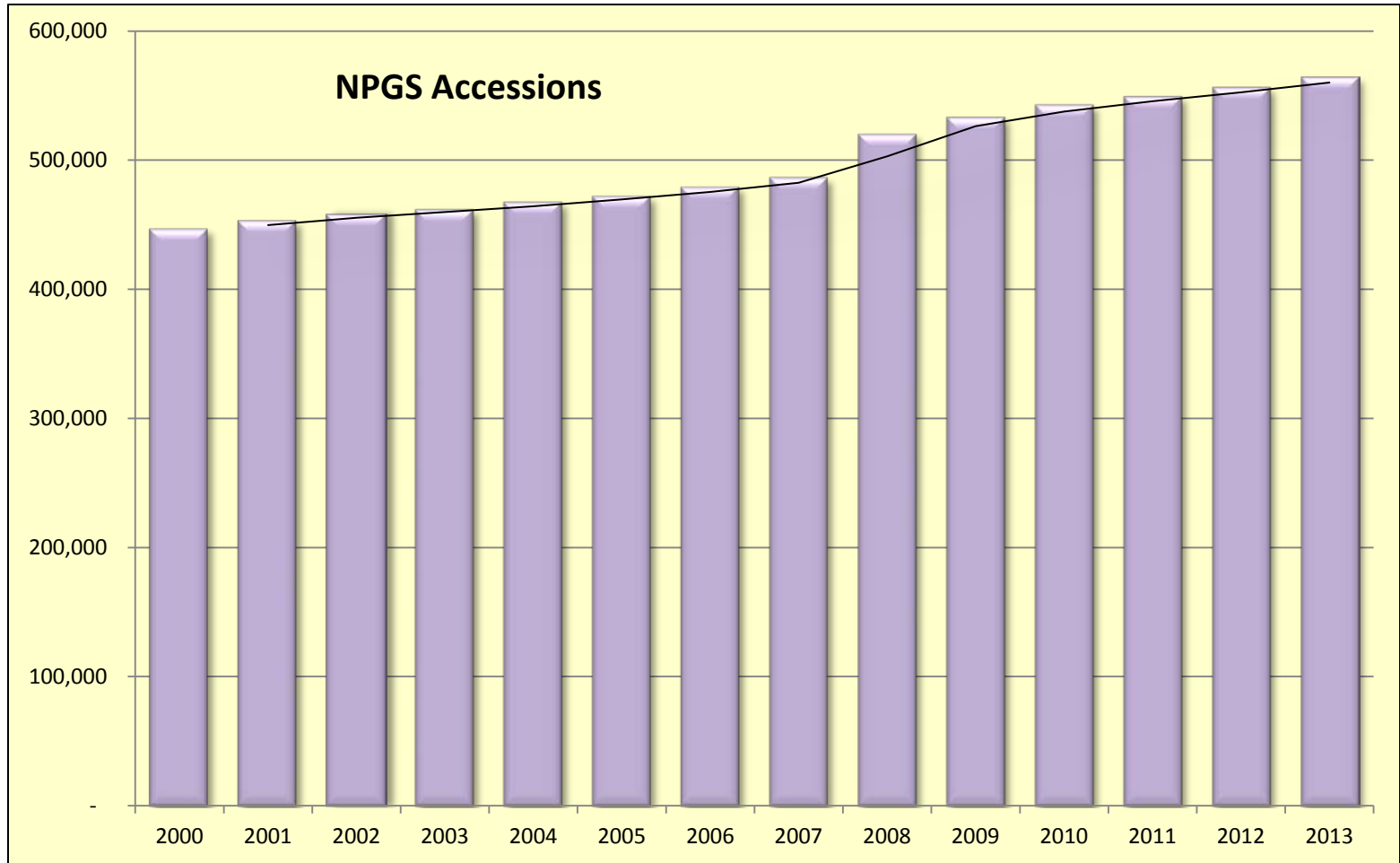
Peter Bretting

USDA/ARS Office of National Programs

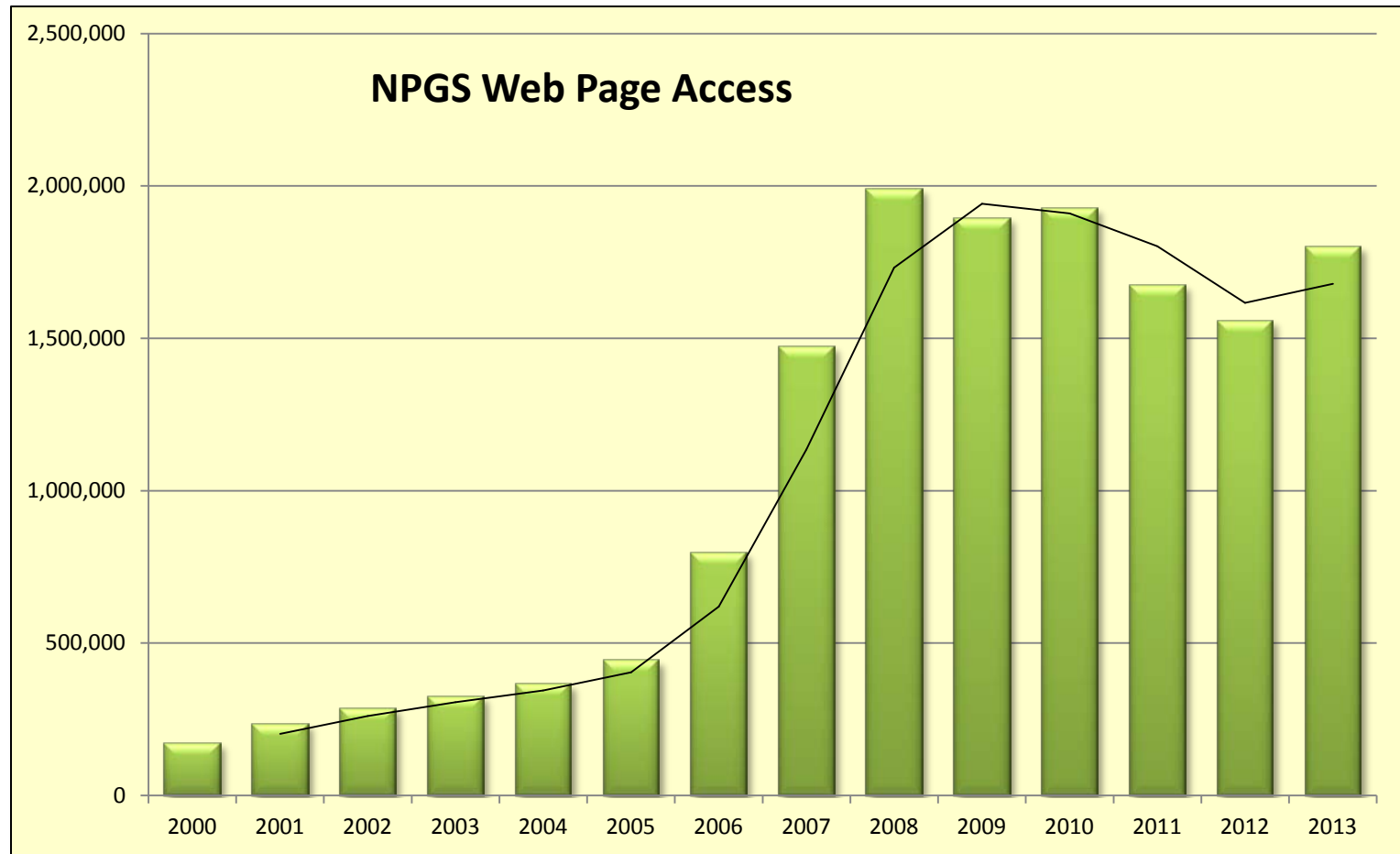
USDA National Plant Germplasm System (NPGS)



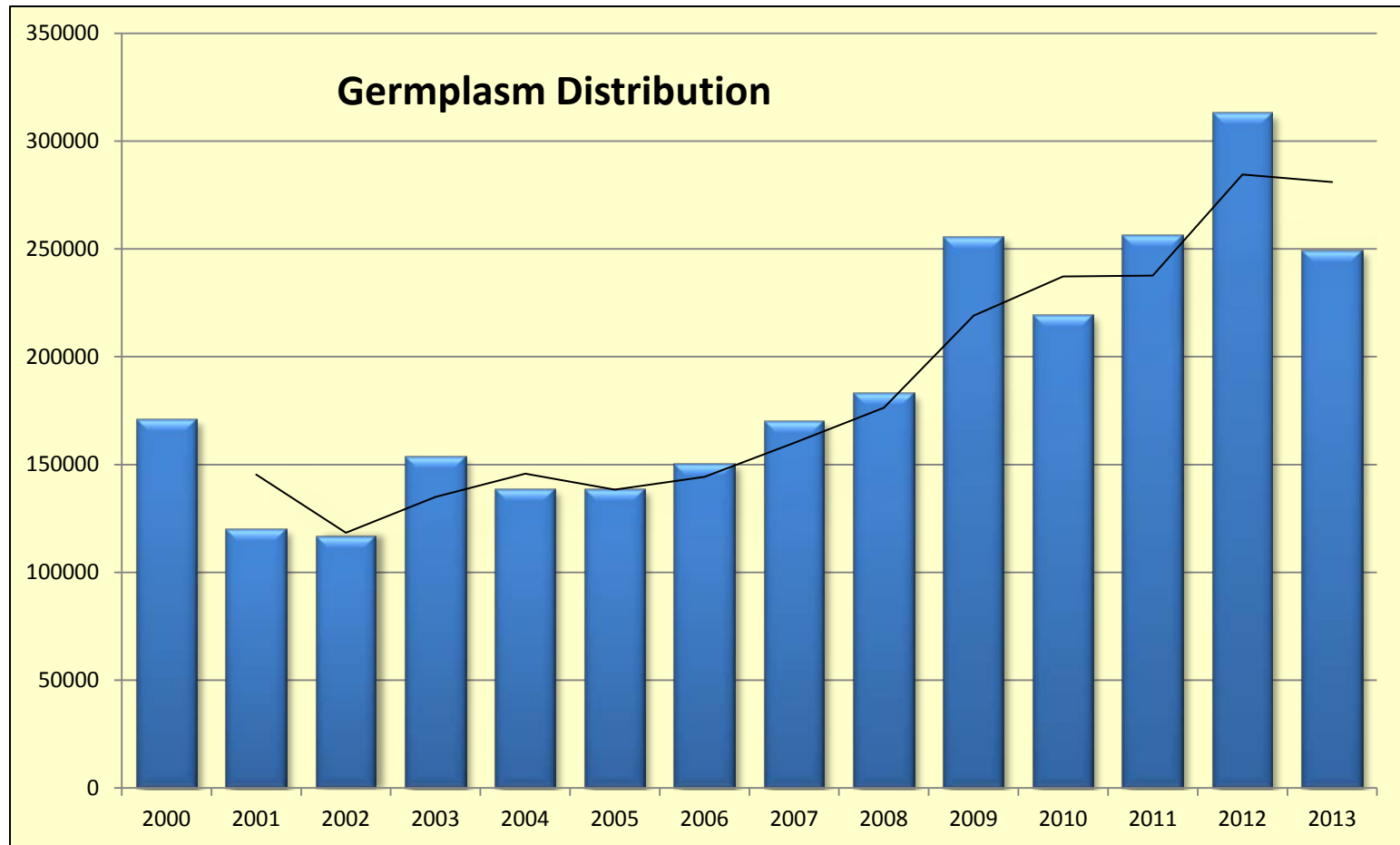
NUMBER OF NPGS ACCESSIONS 2000-2013



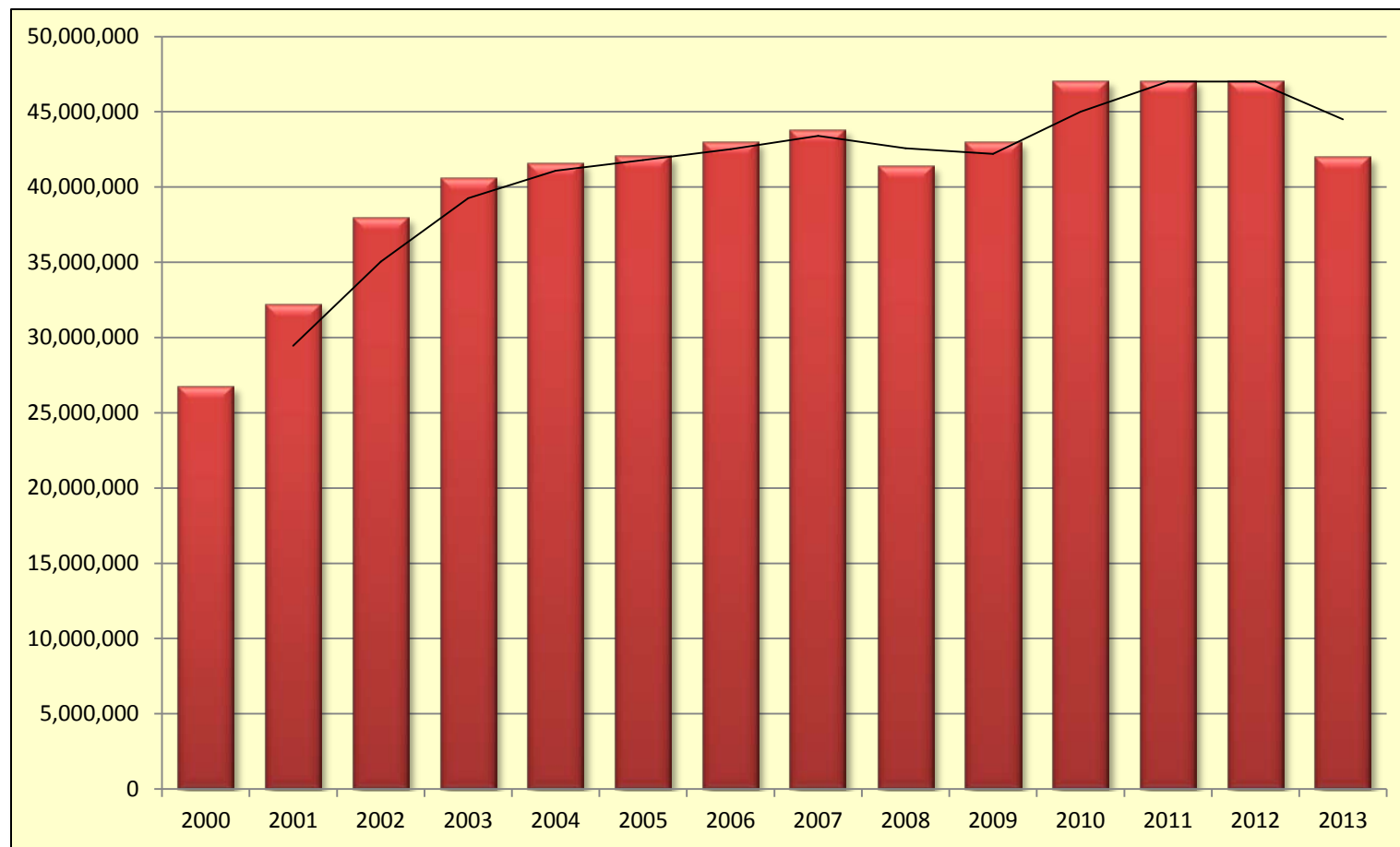
DEMAND FOR NPGS INFORMATION 2000-2013



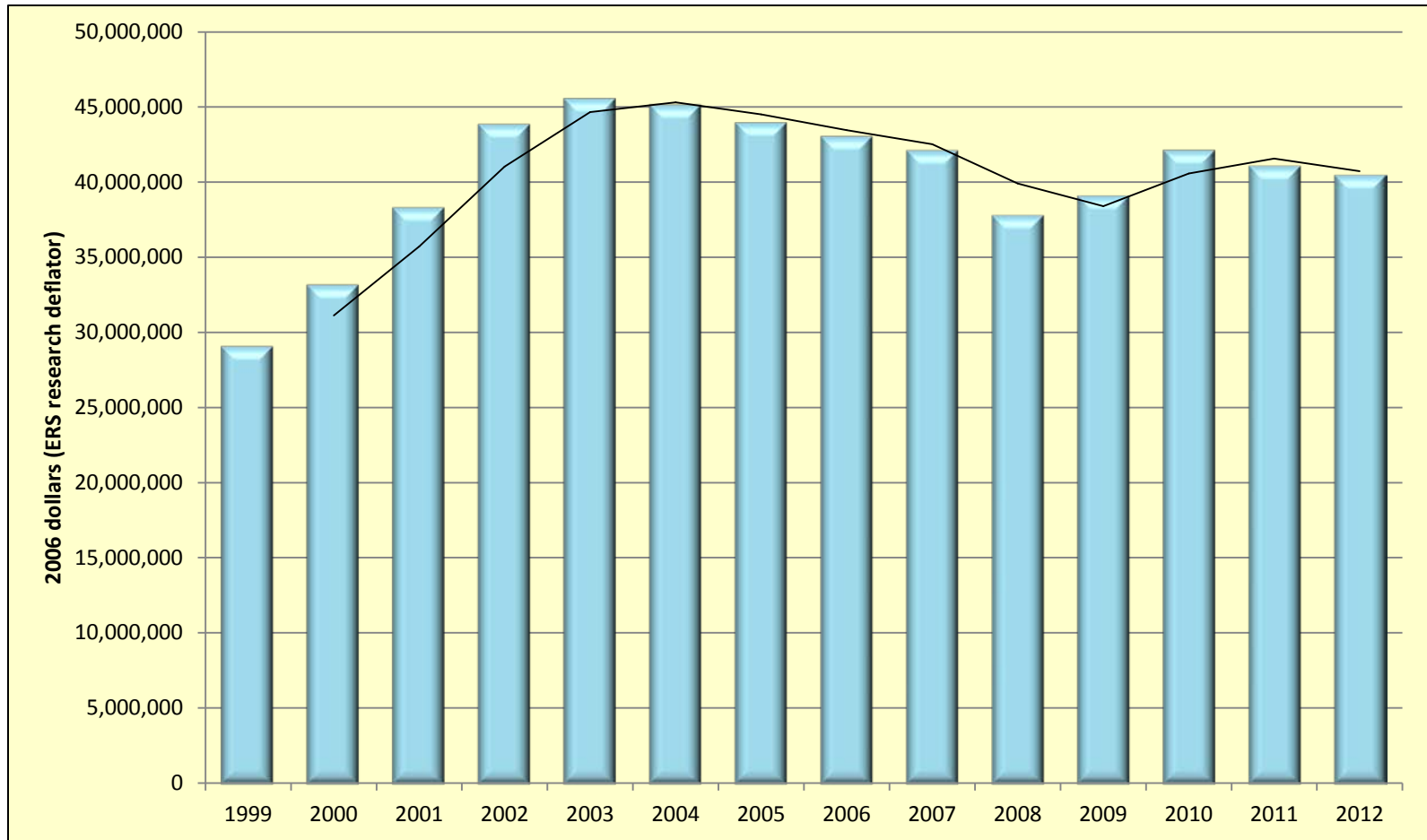
DEMAND FOR NPGS GERMPLASM 2000-2013



ARS NATIONAL PLANT GERMPLASM SYSTEM BUDGET 2000-2013



ARS National Plant Germplasm System Budget, Real, 1999-2012



Notable NPGS Developments

- **1-17 October 2013: Furlough**
 - Only designated key personnel permitted to work.
 - No germplasm lost.
 - No germplasm distributed; GRIN off-line.
 - Delayed harvests, delayed shipments to winter nurseries.
- **FAO International Treaty on Plant Genetic Resources for Food and Agriculture**
 - Seed industry advocates US ratification.

Notable NPGS Developments

- **Stronger and more extensive international partnerships**
 - **Hosted CGIAR Genebanks Annual General Meeting at NCRPIS, Ames.**
 - **Global Crop Diversity Trust: Developing international project for increasing the use of PGRFA (especially crop wild relatives)**
 - **PRC, S. Korea, Canada, Mexico, Colombia national genebanks: training at NPGS**

Notable NPGS Developments

- **NPGS staff changes**
 - Retirements or resignations: M. Welch (Pullman), D. Dierig (Ft. Collins), F. Zee (Hilo), E. Garvey (Beltsville), G. Romano (Parlier), and W. Yan (Stuttgart).
 - Position changes: S. Greene filled the vice-Ellis position at Ft. Collins, and T. Kisha filled the vice-Welch position at Pullman.

National Center for Genetic Resources Preservation

**1111 South Mason St
Fort Collins, CO**





Plant and Animal Genetic Resources Preservation Unit

*Safety back up of our national collection of genetic resources
through diligent stewardship, research and communication
(Harvey Blackburn, Acting RL; Stephanie Greene, Seed Curator; Maria
Jenderek, Clonal Curator)*

Plant Germplasm Preservation Research Unit

*Developing state-of-art tools to improve gene bank capacity
and efficiency
(Christina Walters , RL; Gayle Volk, Research Plant Physiologist; Chris Richards,
Research Geneticist)*

Seed and Clonal Base Collection

82% - seed collection backed up

15% - clonal collection backed up

3% - NPGS accessions unique to NCGRP





Safety backup of non-NPGS germplasm

- 7377 Plant Variety Protection voucher samples
- 2275 *Journal of Plant Registration* voucher samples
- 300,000 accessions “black-box” – CGIAR, Seed Savers Exchange, etc
- Rare and Endangered species- Center for Plant Conservation
- USFS, Indian Tribes (*Fraxinus*), special collections (i.e. McClintock’s maize lines)



2014 Activities

- Received 8,371 accessions for back up
- Cryopreserved 145 accessions- potato, sugar cane, banana, sweet potato
- 6786 germination tests on incoming accessions and 1063 monitor tests conducted on stored seed
- 114 orders sent to users, comprising 603 seed inventories
- 18,473 accessions are ready to be shipped to Svalbard

Seed Base Collection- shifting emphasis

- Secure 12% using “critical back up” procedure
- Focus on monitoring seeds already in storage
 - ~ 25% of collection last tested 10-20 years ago; 24,863 samples last tested > 20 yr ago
 - High priority- monitor short longevity species
 - Replace low viability samples with fresh seed
- Wild species (SOS, CWR) = more time and resources to process and test

Clonal Base Collection- shifting emphasis

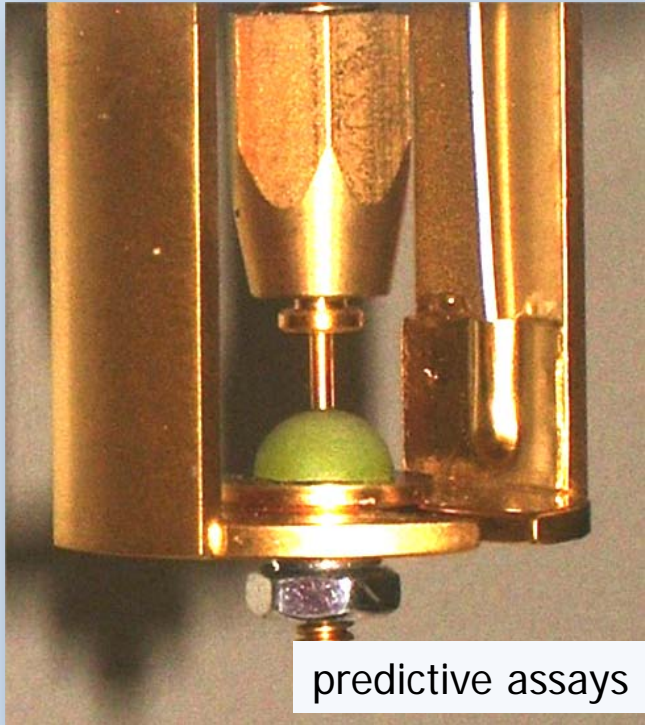
- More work on monocots (sugarcane, banana, pineapple)
- Beginning to address CWR needs (Solanum, Frageria)
- Use dormant buds as main material for temperate trees and shrubs



Plant Germplasm Preservation Research Unit

Developing state-of-art tools to improve gene bank capacity and efficiency

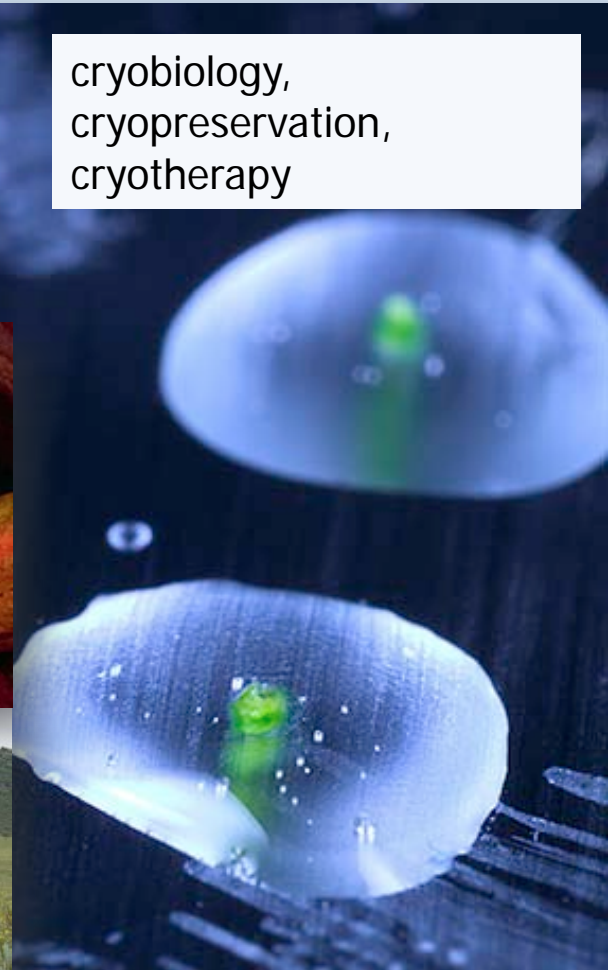
cryobiology,
cryopreservation,
cryotherapy



predictive assays



tropical & subtropical
crops & wild species



- Continued work on apple diversity (*with Geneva, NY and China-MOST*)

- Cryotherapy and backing-up Citrus collection (*with Riverside, CA*)

- Avocado stress response to excision, tissue culture & water stress)(*with Miami, FL*)



- Markers and models to quantify diversity of wheat collection (*with Aberdeen, ID*)

- Changes in wild rye and barley populations in nature and in genebanks (*with European collaborators*)

- Water relations and stress response in developing Cacao embryos (*with Mayaguez, PR*)



- Oak seed physiology and cryopreservation (*with National Arboretum, DC, Ames, IA and others*)
- Seed physiology of walnuts, pecans, pistachio, chestnut, magnolia and willow (*with Davis, CA & Ames, IA & National Arboretum and others*)
- Pollen physiology of pecans, cotton and avocado (*with College Station, TX & Miami, FL*)



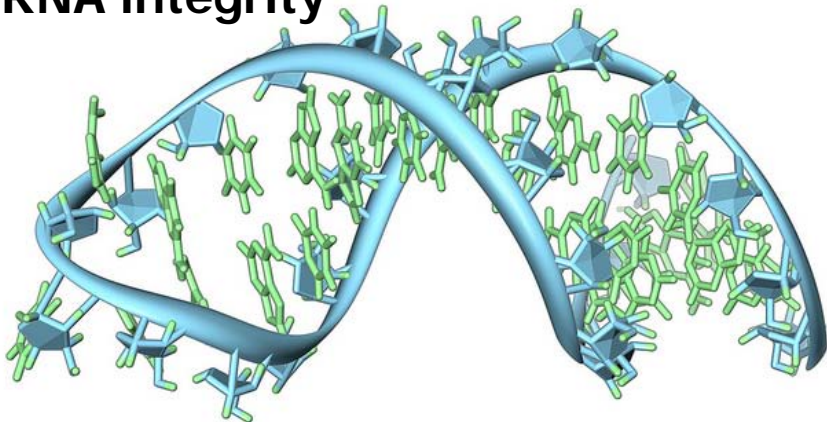
Daniel Towsey



- Seed longevity studies
(with *PAGRP*, *China-MOST*
and others)

- Markers to predict seed
aging during storage (with
PAGRP)

Looking for a postdoc to study
RNA integrity



Evan Meyer with Rancho Santa Ana testing
65 year old seed from Went/Munz expt.

Questions?



Thanks from Fort Collins!

The NPGS Plant Exploration/Exchange Program

- fills gaps in the NPGS
- proposals accepted yearly by NGRL- PEO for explorations the next fiscal year
- guidelines distributed to CGC Chairs
- explorations and exchanges
- CGCs and curators must endorse proposals

2014 NPGS Plant Explorations

Camelina and other crops

Lactuca spp.

Walnut and grape

Fraxinus spp.

Fraxinus pennsylvanica

Solanum jamesii

Cucurbita spp.

Betula nigra

Spiraea and Diervilla

Kentucky coffeetree

Chenopodium spp.

Armenia

Azerbaijan

Georgia

United States (AL, AR, MI)

United States (ND)

United States (AZ)

United States (FL, AZ, CA, NM)

United States (IA)

United States (IA)

United States (IN, IL)

United States (UT, WY, AZ, NM, CO, NE, MN)

2015 Plant Explorations

Postponed

Black cohosh	United States (NC, VA, TN)
<i>Beta</i> spp.	United States (CA)
<i>Fraxinus</i> spp.	United States (OH, KY, IN, TN)
Kentucky coffeetree	United States
Herbaceous ornamentals	United States (CA)
Food legumes	Nepal

Proposals

4 foreign proposals and one domestic proposal

Reconnaissance

Small fruits	Vietnam
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Access and Benefit Sharing for International Explorations

- prior informed consent (PIC) obtained from national authority
- includes agreement on the sharing of benefits
- acceptable benefits are “in-kind” (training, equipment purchase, increase projects, etc.)
- PEO obtains PIC
- SMTA provides terms for some explorations

Cooperation with Missouri Botanic Garden in Central Asia

- new agreement established
- additional funding from the Woody Landscape Repository
- host country scientists write proposals, obtain national permission, and collect
- past explorations include:
 - Lactuca* spp. – Armenia, Azerbaijan, Tajikistan, Kyrgyzstan, Uzbekistan
 - Camelina* spp. -- Armenia
 - Juglans regia* – Tajikistan, Kyrgyzstan



GRIN Taxonomy for Plants

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GRIN taxonomic data provide the structure and nomenclature for accessions of the National Plant Germplasm System (NPGS), part of the National Genetic Resources Program (NGRP) of the United States Department of Agriculture's (USDA's) Agricultural Research Service (ARS). In **GRIN Taxonomy for Plants** all families and genera of vascular plants and 52,191 species from throughout the world are represented, especially economic plants and their relatives. Information on scientific and common names, classification, distribution, references, and economic impacts are provided.

Cite as:

USDA, ARS, National Genetic Resources Program.

Germplasm Resources Information Network - (GRIN) [Online Database].

National Germplasm Resources Laboratory, Beltsville, Maryland.

URL: <http://www.ars-grin.gov/~sbmljw/cgi-bin/index.pl?language=en> (19 November 2014)

Last modified: 27 June 2012

GRIN-Taxonomy Crop Wild Relative (CWR) Inventory



- 1. PEO Project initiated in 2008 to assess CWR germplasm needs for NPGS**
- 2. Identify CWR by “gene pool” status**
- 3. Initial work prioritized by economic value of crops**
- 4. Supporting data gleaned from multiple sources**
- 5. Sought external review of treatment**

Genetic Relative Classification Criteria



Primary – Taxa that cross readily with the crop (or can be predicted to do so based on their taxonomic relationships), yielding (or being expected to yield) fertile hybrids with good chromosome pairing, making gene transfer through hybridization simple.

Genetic Relative Classification Criteria



Secondary – Taxa that will successfully cross with the crop (or can be predicted to do so based on their taxonomic relationships), but yield (or would be expected to yield) partially or mostly sterile hybrids with poor chromosome pairing, making gene transfer through hybridization difficult.

Genetic Relative Classification Criteria



Tertiary – Taxa that can be crossed with the crop (or can be predicted to do so based on their taxonomic relationships), but hybrids are (or are expected to be) lethal or completely sterile. Special breeding techniques, some yet to be developed, are required for gene transfer.

Genetic Relative Classification Criteria



Graftstock – Taxa used as rootstocks for grafting scions of a crop, or used as genetic resources in the breeding of such rootstocks.

Data Elements



- 1. Taxonomic or phylogenetic relationship of crop and CWR**
- 2. Genetic relative status of CWR**
- 3. Geographical distribution of CWR**
- 4. Passport data of crop and CWR accessions**

Crop Genera Already Treated (135 crops)



Cereal: *Avena*, *Hordeum*, *Oryza*, *Secale*, *Sorghum*, *Triticum*, *Zea*

Fiber: *Gossypium*, *Linum*

Forage: *Medicago*

Fruit/Nut: *Actinidia*, *Ananas*, *Carica*, *Carya*, *Castanea*, *Citrus*, *Citrullus*, *Corylus*, *Eriobotrya*, *Fragaria*, *Juglans*, *Malus*, *Olea*, *Persea*, *Phoenix*, *Pistacia*, *Prunus*, *Pyrus*, *Ribes*, *Solanum*, *Theobroma*, *Vaccinium*, *Vitis*

Oilseed: *Brassica*, *Carthamus*, *Crambe*, *Helianthus*, *Olea*

Pseudocereal: *Chenopodium*

Pulse: *Arachis*, *Cicer*, *Glycine*, *Lens*, *Lupinus*

Vegetable: *Allium*, *Asparagus*, *Beta*, *Brassica*, *Capsicum*, *Cichorium*, *Cucumis*, *Cucurbita*, *Cynara*, *Daucus*, *Eruca*, *Ipomoea*, *Lactuca*, *Pastinaca*, *Phaseolus*, *Pisum*, *Raphanus*, *Rheum*, *Sechium*, *Solanum*, *Spinacia*, *Vicia*, *Vigna*

Other: *Coffea*, *Humulus*, *Manihot*, *Nicotiana*, *Saccharum*, *Sinapis*

GRIN Taxonomy for Plants

Query all GRIN TAXONOMY FOR PLANTS:

[Advanced queries - species data, multiple criteria](#)

[Simple queries - species data, single criterion](#)

[Queries of family and generic data](#)

Query specialized parts of GRIN TAXONOMY FOR PLANTS:

[Economic Plants](#)

[Crop Wild Relatives](#)

[Noxious Weeds - Federal and State \(U.S.A.\)](#)

[Rare Plants](#)

[From Seed Associations' Web Page](#)

[NRCS/PEAS Database Nomenclature](#)

[Rhizobial Nodulation Data in GRIN](#)

Cite as:
 USDA, ARS, National Genetic Resources Program.
Germplasm Resources Information Network - (GRIN) [Online Database].
 National Germplasm Resources Laboratory, Beltsville, Maryland.
 URL: <http://www.ars-grin.gov/cgi-bin/npgs/html/queries.pl?language=en> (11 June 2014)

Options

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- Advanced Query of Species Data
- Simple Query of Species Data
- Families and Genera in GRIN
- World Economic Plants in GRIN
- Crop Wild Relative Data in GRIN
- Federal and State Noxious Weeds in GRIN
- Rare and Endangered Plants in GRIN
- Seed Associations' Web Page in GRIN
- Nomenclature of the PEAS database in GRIN
- Rhizobial Nodulation Data in GRIN

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GRIN Taxonomy for Plants

Query Crop Relatives in GRIN

Enter search criteria below.

Any or all fields can be searched. Wild cards (*) are accepted.

submit query

clear form

Crop:

- ALL
- AJI – Capsicum baccatum var. pendulum
- ALFALFA – Medicago sativa subsp. sativa
- ALMOND – Prunus dulcis
- APPLE – Malus domestica
- APRICOT – Prunus armeniaca
- ARTICHOKE – Cynara cardunculus
- ARUGULA – Eruca vesicaria subsp. sativa
- ASPARAGUS – Asparagus officinalis
- AVOCADO – Persea americana

(Use shift or control key to make multiple selections.)

Genus name: (e.g. *Oryza* [without author])

Note: Only returns CWR in that genus. Select by crop to return all CWR of its crops.

Genetic relative status: ☒ primary ☒ secondary ☒ tertiary ☒ graftstock

Family(ies):

- ALL FAMILIES
- all pteridophytes
- all gymnosperms
- all angiosperms
- Abietaceae
- Abolbodaceae
- Abrophyllaceae

(Use shift or control key to make multiple selections.)

Native distribution:

Continent: ALL CONTINENTS ▼

Region: ALL REGIONS ▼

Country(ies):

- ALL COUNTRIES
- Afghanistan
- Albania
- Algeria
- American Samoa
- Andorra
- Angola

(Use shift or control key to make multiple selections.)

State/Province: (e.g. Alabama)

Include non-native distribution ☐

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Crop: ALFALFA

(compiled by Dr. Blanca León; reviewed by Dr. Stephanie L. Greene, Geneticist/Curator, USDA/ARS, National Temperate Forage Legume Genetic Resources Unit, Prosser, Washington on 7 November 2012)

Crop taxa:

- 1. [Medicago sativa L. subsp. sativa](#) – alfalfa
- 2. [Medicago sativa L. nothosubsp. varia \(Martyn\) Arcang.](#) – variegated alfalfa
- 3. [Medicago sativa L. subsp. falcata \(L.\) Arcang.](#) – sickle alfalfa

Crop wild relatives:

Primary

- 1. [Medicago sativa L. subsp. falcata \(L.\) Arcang. var. falcata \(L.\) Döll](#) [tetraploids] — [References]
- 2. [Medicago sativa L. subsp. glomerata \(Balb.\) Rouy](#) [tetraploids] — [References]
- 3. [Medicago sativa L. subsp. sativa](#) [wild types] — [References]
- 4. [Medicago sativa L. nothosubsp. tunetana Murb.](#) [tetraploids] — [References]
- 5. [Medicago sativa L. nothosubsp. varia \(Martyn\) Arcang.](#) [tetraploids] — [References]
- 6. [Medicago sativa L. subsp. falcata \(L.\) Arcang. var. viscosa \(Rchb.\) Posp.](#) [tetraploids] — [References]

Secondary

- 1. [Medicago prostrata Jacq.](#) — [References]
- 2. [Medicago sativa L. subsp. caerulea \(Less. ex Ledeb.\) Schmalh.](#) — [References]
- 3. [Medicago sativa L. subsp. falcata \(L.\) Arcang. var. falcata \(L.\) Döll](#) [diploids] — [References]
- 4. [Medicago sativa L. subsp. glomerata \(Balb.\) Rouy](#) [diploids] — [References]
- 5. [Medicago sativa L. nothosubsp. tunetana Murb.](#) [diploids] — [References]
- 6. [Medicago sativa L. nothosubsp. varia \(Martyn\) Arcang.](#) [diploids] — [References]
- 7. [Medicago sativa L. subsp. falcata \(L.\) Arcang. var. viscosa \(Rchb.\) Posp.](#) [diploids] — [References]

Tertiary

- 1. [Medicago arborea L.](#) — [References]
- 2. [Medicago cancellata M. Bieb.](#) — [References]
- 3. [Medicago daghestanica Rupr. ex Boiss.](#) — [References]
- 4. [Medicago hybrida \(Pourr.\) Trautv.](#) — [References]
- 5. [Medicago marina L.](#) — [References]
- 6. [Medicago papillosa Boiss.](#) — [References]
- 7. [Medicago papillosa Boiss. subsp. macrocarpa \(Boiss.\) Urb.](#) — [References]
- 8. [Medicago papillosa Boiss. subsp. papillosa](#) — [References]
- 9. [Medicago pironae Vis.](#) — [References]
- 10. [Medicago rhodopea Velen.](#) — [References]
- 11. [Medicago rupestris M. Bieb.](#) — [References]
- 12. [Medicago ruthenica \(L.\) Trautv.](#) — [References]
- 13. [Medicago saxatilis M. Bieb.](#) — [References]

Crop Relatives in GRIN Taxonomy

(for the query: family = 'all families' & native country = 'all countries' & crops = 'chickpea' & genetic relative status = 'GR1, GR2, GR3, & GS' & repositories = 'all')

Follow links for a) **GRIN** taxon reports or b) to view literature supporting this items for explanation.)

Crop: CHICKPEA

(compiled by Dr. Blanca León; reviewed by Dr. Michael A. Grusak, USDA/ARS Dr. Clarice Coyne, USDA/ARS, Western Regional Plant Introduction Station, Pullman, WA)

Crop taxon:

1. [*Cicer arietinum* L.](#) – chickpea

Crop wild relatives:

Primary

1. [*Cicer reticulatum* Ladiz.](#) — [\[References\]](#)

Secondary

1. [*Cicer echinospermum* P. H. Davis](#) — [\[References\]](#)

Tertiary

1. [*Cicer atlanticum* Coss. ex Maire](#) — [\[References\]](#)
2. [*Cicer bijugum* Rech. f.](#) — [\[References\]](#)
3. [*Cicer incisum* \(Willd.\) K. Malý](#) — [\[References\]](#)
4. [*Cicer judaicum* Boiss.](#) — [\[References\]](#)
5. [*Cicer pinnatifidum* Jaub. & Spach](#) — [\[References\]](#)

http://www.ars-grin... Cicer reticulatum info...

File Edit View Favorites Tools Help

Taxon: [*Cicer reticulatum* Ladiz.](#)

Genus: [*Cicer*](#) subgenus: [*Cicer*](#) section: [*Cicer*](#) series: [*Cicer*](#)
 Family: [Fabaceae](#) (alt. [Leguminosae](#)) subfamily: [Faboideae](#) tribe: [Ciceraceae](#). Also placed in: [Papilionaceae](#)
 Nomen number: 301039
 Place of publication: Notes Roy. Bot. Gard. Edinburgh 34(2):201. 1975
 Name verified on: 20-Jan-1987 by ARS Systematic Botanists. Last updated: 19-Jun-2012
 Species priority site is: Western Regional Plant Station ([WRS](#))
 Accessions: 34 in National Plant Germplasm System.

☐ all available (and unavailable ☐) NPGS accessions. Include images ☐ and historical accessions ☐ sorted by number
☐ or names ☐.
☐ all available (and unavailable ☐) NPGS accessions by country.
☐ Check [PlantSearch](#) database of [Botanic Gardens Conservation International](#) for possible non-NPGS germplasm.

Economic importance:

- Gene sources: cold tolerance for chickpea ([Javadi, F. et al. 2007](#))
- Gene sources: high yield for chickpea ([Iruela, M. et al. 2002](#))
- Gene sources: pest resistance for chickpea ([Javadi, F. et al. 2007](#))
- Gene sources: primary genetic relative of chickpea ([Javadi, F. et al. 2007](#))
- Gene sources: probable progenitor of chickpea ([Javadi, F. et al. 2007](#))

Distributional range:

Native:

- ASIA-TEMPERATE
 Western Asia: Turkey >:

References:

- Abbo, S. et al. 2007. Utilization of wild relatives. 348 In: Yadav, S. S. et al., eds., Chickpea breeding and management. 348.
- Davien, A. M. R. et al. 2007. A natural infragenetic classification for *Cicer* (Leguminosae, Ciceraceae). [Biomes](#) 52:379-400.
- Euro-Med Editorial Committee. [Euro-Med Plantbase: the information resource for Euro-Mediterranean plant diversity \(on-line resource\)](#).
- Infante, A. et al. 1996. Screening wild *Cicer* species for resistance to Fusarium wilt. [Pl. Dis.](#) 80:42-44.
- Iruela, M. et al. 2002. Phylogenetic analysis in the genus *Cicer* and cultivated chickpea using RAPD and ISSR markers. [Theor. Appl. Genet.](#) 104:643-651.
- Javadi, F. et al. 2007. Geographical diversification of the genus *Cicer* (Leguminosae: Papilionoideae) inferred from molecular phylogenetic analyses of chloroplast and nuclear DNA sequences. [Bot. J. Linn. Soc.](#) 154:175-186.
- Leonard, W. de et al. 1996. Pollen and seed morphology of *Cicer arietinum* L. cultivars and relationships with *C. reticulatum* Ladiz. and *C. echinospermum* P. H. Davis. [Pl. Genet. Resources Newsletter](#), 105:29-36.
- Maesen, L. J. G. van der et al. 2007. Taxonomy of the genus *Cicer* revisited. 2:14-43 In: Yadav, S. S. et al., eds., Chickpea breeding and management. 2:14-43.
- Maesen, L. J. G. van der. 1987. Origin, history and taxonomy of chickpea. 29 In: Saxena, M. C. & K. B. Singh, The chickpea. 29.
- Maxted, N. 2012. Review of *Fabaceae* Ciceraceae, Fabaceae (Viciaceae) data for *World Economic Plants*, ed. 2. pers. comm. via e-mail on 24 Jan.
- Porcher, M. H. et al. [Searchable World Wide Web Multilingual Multicript Plant Name Database \(MMPND\) \(on-line resource\)](#).
- Redden, R. J. & J. D. Berger. 2007. History and origin of chickpea. 1:1-13 In: Yadav, S. S. et al., eds., Chickpea breeding and management. 1:1-13.
- Shan, F. et al. 2005. Geographical patterns of genetic variation in the world collections of wild annual *Cicer* characterized by amplified fragment length polymorphisms. [Theor. Appl. Genet.](#) 110:381-391.
- Singh, K. B. & B. Ocampo. 1997. Exploitation of wild *Cicer* species for yield improvement in chickpea. [Theor. Appl. Genet.](#) 95:191-222.
- Thompson, J. P. et al. 2011. Hybridisation of Australian chickpea cultivars with wild *Cicer* spp. increases resistance to root-

Crop Relatives in [GRIN](#) T

(for the query: **family** = 'all families' & **native country** = 'all countries' & **crops** = 'chickpea' & **GS** = 'all' & **repositories** = 'all')

Follow links for a) **GRIN taxon reports** or b) to view literature supporting this gene items for explanation.)

Crop: CHICKPEA

(compiled by Dr. Blanca León; reviewed by Dr. Michael A. Grusak, USDA/ARS Childs Dr. Clarice Coyne, USDA/ARS, Western Regional Plant Introduction Station, Pullman,

Crop taxon:

1. [Cicer arietinum L.](#) – chickpea

Crop wild relatives:

Primary

1. [Cicer reticulatum Ladiz.](#) — [\[References\]](#)

Secondary

1. [Cicer echinospermum P. H. Davis](#) — [\[References\]](#)

Tertiary

1. [Cicer atlanticum Coss. ex Maire](#) — [\[References\]](#)
2. [Cicer bijugum Rech. f.](#) — [\[References\]](#)
3. [Cicer incisum \(Willd.\) K. Malý](#) — [\[References\]](#)
4. [Cicer judaicum Boiss.](#) — [\[References\]](#)
5. [Cicer pinnatifidum Jaub. & Spach](#) — [\[References\]](#)

http://www.ars-grin... Literature citations for..

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Literature References for [GRIN](#) Taxonomy Crop Relative Gene Pool Assignment

Taxon: *Cicer echinospermum* P. H. Davis

- Davies, A. M. R. et al. 2007. A natural infrageneric classification for *Cicer* (Leguminosae, Cicereae). [Blumea](#) 52:379–400. [This study complements Maesen et al.'s 2007 (Chickpea Breed Mgmt 2:14–45.) proposed taxonomy; *Cicer echinospermum* clustered with *C. reticulatum* and *C. arietinum* as in other previous studies; all these three species were recognized in subgenus *Cicer* section *Cicer* series *Cicer*.]
- Javadi, F. et al. 2007. Geographical diversification of the genus *Cicer* (Leguminosae: Papilionoideae) inferred from molecular phylogenetic analyses of chloroplast and nuclear DNA sequences. [Bot. J. Linn. Soc.](#) 154:154–175. [This study confirmed the monophyly of the genus *Cicer*; *C. arietinum* affinities were strongly supported with *C. echinospermum* and *C. reticulatum* within a monophyletic clade that also included as a sister group *C. bijugum*, *C. judaicum*, *C. pinnatifidum* and *C. incisum*.]
- Ahmad, F. & A. E. Slinkard. 2004. The extent of embryo and endosperm growth following interspecific hybridization between *Cicer arietinum* L. and related annual wild species. [Genet. Resources Crop Evol.](#) 51:765–772. [This study examined conditions of embryogenic development arrest in crosses involving chickpea and its secondary and tertiary gene pool species; it performed crosses between *Cicer arietinum* × *C. echinospermum*, and also its reciprocal; it found differential growth between the former cross and its reciprocal; after 10 days all embryo and endosperm tissue degenerates for the reciprocal hybrid, while for the former cross embryo tissue continues its development.]
- Thompson, J. P. et al. 2011. Hybridisation of Australian chickpea cultivars with wild *Cicer* spp. increases resistance to root-lesion nematodes (*Pratylenchus thornei* and *P. neglectus*). [Austral. Pl. Pathol.](#) 40:601–611. [This study examined hybrids derived from crosses between resistant lines of *Cicer echinospermum* (male parent) and *C. arietinum*; these hybrids showed greater resistance to both nematodes than other tested wild species.]
- Singh, K. B. & B. Ocampo. 1997. Exploitation of wild *Cicer* species for yield improvement in chickpea. [Theor. Appl. Genet.](#) 95:418–423. [This study obtained hybrids between cultivated *Cicer arietinum* as a female parent and *C. echinospermum*.]

Query Crop Relatives in GRIN

Enter search criteria below.

Any or all fields can be searched. Wild cards (*) are accepted.

submit query

clear form

Crop:

ALL
AJI – Capsicum baccatum var. pendulum
ALFALFA – Medicago sativa subsp. sativa
ALMOND – Prunus dulcis
APPLE – Malus domestica
APRICOT – Prunus armeniaca
ARTICHOKE – Cynara cardunculus
ARUGULA – Eruca vesicaria subsp. sativa
ASPARAGUS – Asparagus officinalis
AVOCADO – Persea americana

(Use shift or control key to make multiple selections.)

Genus name:

(e.g. *Oryza* [without author])

Note: Only returns CWR in that genus. Select by crop to return all CWR of its crops.

Genetic relative status:

primary ☒secondary ☒tertiary ☐graftstock ☐

Family(ies):

Aspidistraceae
Aspleniaceae
Asteliaceae
Asteraceae/Compositae
Asteranthaceae
Asteropeiaceae
Astragalaceae

(Use shift or control key to make multiple selections.)

Native distribution:

Continent:

ALL CONTINENTS ▼

Region:

▼

Country(ies):

ALL COUNTRIES
Afghanistan
Albania
Algeria
American Samoa
Andorra
Angola

(Use shift or control key to make multiple selections.)

State/Province:

(e.g. Alabama)

Include non-native distribution ☐

Selections

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Crop Relatives in [GRIN](#) Taxonomy

(for the query: family/altfamily = '[Asteraceae](#)' & native country = '[Albania](#)' & crops = '[all](#)' & genetic relative status = '[GR1](#) & [GR2](#)' & repositories = '[all](#)')
([GR1](#) = [GRIN](#) taxon reports; [GR2](#) = [Literature](#))

Follow links for a) [GRIN taxon reports](#) or b) [to view literature supporting this gene pool classification](#) (Place cursor over highlighted items for explanation.)

Crop: [ARTICHOKE](#)

(compiled by Dr. Blanca León)

Crop taxon:

1. [Cynara cardunculus](#) Cardoon and Scolymus Groups – artichoke/cardoon

Crop wild relatives:

Primary

1. [Cynara cardunculus](#) L. subsp. [cardunculus](#) — [[References](#)]

Crop: [CHICORY](#)

(compiled by Dr. Blanca León)

Crop taxon:

1. [Cichorium intybus](#) L. – chicory

Crop wild relatives:

Secondary

1. [Cichorium pumilum](#) Jacq. — [[References](#)]

Crop: [ENDIVE](#)

(compiled by Dr. Blanca León)

Crop taxon:

1. [Cichorium endivia](#) L. subsp. [endivia](#) – endive

Crop wild relatives:

Primary

1. [Cichorium pumilum](#) Jacq. — [[References](#)]

Secondary

1. [Cichorium intybus](#) L. — [[References](#)]

Crop: [LETTUCE](#)

(compiled by Dr. John H. Wiersema; reviewed by Dr. Beiquan Mou, USDA/ARS, Salinas, California on 7 June 2013)

Crop taxa:

1. [Lactuca sativa](#) L. – lettuce
2. [Lactuca sativa](#) Cos or Romaine Lettuce Group ([Lactuca sativa](#) L. var. [longifolia](#) Lam.) – romaine lettuce
3. [Lactuca sativa](#) Crisphead (Iceberg or Cabbage) and Butterhead Lettuce Groups ([Lactuca sativa](#) L. var. [capitata](#) L.) – head lettuce
4. [Lactuca sativa](#) Cutting or Curled Lettuce Group ([Lactuca sativa](#) L. var. [crispa](#) L.) – leaf lettuce
5. [Lactuca sativa](#) Stalk (or Asparagus) Lettuce Group ([Lactuca sativa](#) L. var. [angustana](#) L. H. Bailey) – stalk lettuce

Crop wild relatives:

Primary

1. [Lactuca serriola](#) L. — [[References](#)]

Secondary

1. [Lactuca saligna](#) L. — [[References](#)]

Query Crop Relatives in GRIN

Enter search criteria below.

Any or all fields can be searched. Wild cards (*) are accepted.

Check wild origin data against known wild range: ☐

Crop:

RYE – *Secale cereale*
 SAFFLOWER – *Carthamus tinctorius*
 SORGHUM – *Sorghum bicolor*
 SOYBEAN – *Glycine max*
 SPINACH – *Spinacia oleracea*
STRAWBERRY – *Fragaria ananassa*
 SUGARBEET – *Beta vulgaris*
 SUGARCANE – *Saccharum officinarum*
 SUNFLOWER – *Helianthus annuus*
 SWEET-POTATO – *Ipomoea batatas*

(Use shift or control key to make multiple selections.)

Genus name: (e.g. *Oryza* [without author])

Note: Only returns CWR in that genus. Select by crop to return all CWR of its crops.

Genetic relative status: ☒ primary ☒ secondary ☒ tertiary ☒ graftstock ☒

Family(ies):

ALL FAMILIES
 all pteridophytes
 all gymnosperms
 all angiosperms
 Actinidiaceae
 Aizoaceae
 Alliaceae

(Use shift or control key to make multiple selections.)

Geographical distribution:

Continent: Region:

Country(ies):

ALL COUNTRIES
 Afghanistan
 Albania
 Algeria
 Andorra
 Angola
 Anguilla

(Use shift or control key to make multiple selections.)

State/Province: (e.g. Alabama)Search the: ☒ native ☒ naturalized ☒ adventive ☒ cultivated ☒ distribution

Additional criteria to limit search:

Restrict to crops maintained at these NPGS repositories

ALL
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 COR
 COT
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(Use shift or control key to make multiple selections.)

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Crop Relatives in GRIN Taxonomy

(for the query: family = 'all families' & native country = 'all countries' & crops = 'strawberry' & genetic relative status = 'GR1, GR2, GR3, & GS' & repositories = 'all')

Follow links for a) GRIN taxon reports, b) to view literature supporting this gene pool classification, or c) to view list of NPGS accessions by country. (Place cursor over highlighted items for explanation.)

Crop: STRAWBERRY

(compiled by Dr. Blanca León; reviewed by Dr. Kim E. Hummer, USDA/ARS National Clonal Germplasm Repository, Corvallis, Oregon on 8 July 2013)

Crop taxa:

1. *Fragaria* × *ananassa* Duchesne ex Rozier – strawberry — 585 accessions [33 wild] (COR) in NPGS
2. *Fragaria* × *ananassa* Duchesne ex Rozier nothosubsp. *ananassa* – strawberry — 0 accessions in NPGS

Crop wild relatives:

Primary

1. *Fragaria* × *ananassa* Duchesne ex Rozier nothosubsp. *cuneifolia* (Nutt. ex Howell) Staudt — [References] — 9 accessions [8 wild + 1 breeding] (COR) in NPGS
2. *Fragaria chiloensis* (L.) Mill. — [References] — 20 accessions [18 wild + 1 breeding + 1 cultivar] (COR) in NPGS
3. *Fragaria chiloensis* (L.) Mill. subsp. *chiloensis* forma *chiloensis* — [References] — 24 accessions [20 wild + 4 breeding] (COR) in NPGS
4. *Fragaria chiloensis* (L.) Mill. subsp. *lucida* (E. Vilm. ex Gay) Staudt — [References] — 20 accessions [18 wild + 2 cultivars] (COR) in NPGS
5. *Fragaria chiloensis* (L.) Mill. subsp. *pacifica* Staudt — [References] — 33 accessions [all wild] (COR) in NPGS
6. *Fragaria chiloensis* (L.) Mill. subsp. *chiloensis* forma *patagonica* Staudt — [References] — 290 accessions [283 wild + 2 breeding + 5 cultivated] (COR) in NPGS
7. *Fragaria chiloensis* (L.) Mill. subsp. *sandwicensis* (Decne.) Staudt — [References] — 2 accessions [all wild] (COR) in NPGS
8. *Fragaria virginiana* Mill. — [References] — 247 accessions [all wild] (COR) in NPGS
9. *Fragaria virginiana* Mill. subsp. *glauca* (S. Watson) Staudt — [References] — 52 accessions [50 wild + 1 cultivar + 1 cultivated] (COR) in NPGS
10. *Fragaria virginiana* Mill. subsp. *graryana* (Vilm. ex J. Gay) Staudt — [References] — 50 accessions [all wild] (COR) in NPGS
11. *Fragaria virginiana* Mill. subsp. *platypetala* (Rydb.) Staudt — [References] — 50 accessions [all wild] (COR) in NPGS
12. *Fragaria virginiana* Mill. subsp. *virginiana* — [References] — 59 accessions [53 wild + 3 breeding + 3 cultivars] (COR) in NPGS

Secondary

1. *Fragaria cascadiensis* K. E. Hummer — [References] — 34 accessions [all wild] (COR) in NPGS
2. *Fragaria iturupensis* Staudt — [References] — 1 accession [all wild] (COR) in NPGS

Tertiary

1. *Comarum palustre* L. — [References] — 4 accessions [all wild] (NC7-2, W6-2) in NPGS
2. *Dasiphora fruticosa* (L.) Rydb. — [References] — 7 accessions [all wild] (NC7-5, W6-2) in NPGS
3. *Drymocallis glandulosa* (Lindl.) Rydb. — [References] — 1 accession [all wild] (NC7) in NPGS
4. *Drymocallis rupestris* (L.) Soják — [References] — 1 accession [all wild] (NC7) in NPGS
5. *Fragaria bucharica* Losinsk. — [References] — 4 accessions [all wild] (COR) in NPGS
6. *Fragaria chinensis* Losinsk. — [References] — 3 accessions [all wild] (COR) in NPGS
7. *Fragaria corymbosa* Losinsk. — [References] — 4 accessions [all wild] (COR) in NPGS
8. *Fragaria daltoniana* J. Gay — [References] — 1 accession [all wild] (COR) in NPGS
9. *Fragaria hayatae* Makino — [References] — 0 accessions in NPGS
10. *Fragaria iturupensis* Makino — [References] — 25 accessions [23 wild + 2 cultivated] (COR) in NPGS

Crop: ALL
 ALFALFA – *Medicago sativa*
 BARLEY – *Hordeum vulgare*
 BEAN, COMMON – *Phaseolus vulgaris*
 BEAN, LIMA – *Phaseolus lunatus*
 BEAN, SCARLET RUNNER – *Phaseolus coccineus*
 BEAN, TEPARY – *Phaseolus acutifolius*
 BEAN, YEAR – *Phaseolus dumosus*
 CABBAGE, ABYSSINIAN – *Brassica carinata*
 CARROT – *Daucus carota*

(Use shift or control key to make multiple selections.)

Genus name: (e.g. *Oryza* [without author])

Genetic relative status: ☒ primary ☐ secondary ☐ tertiary ☐ graftstock

Family: ALL FAMILIES
 all pteridophytes
 all gymnosperms
 all angiosperms
 Actinidiaceae

(Use shift or control key to make multiple selections.)

Native distribution:
Continent: ALL CONTINENTS
Region:

Country(ies): Australia
 Austria
 Azerbaijan
 Bahamas
 Bahrain

(Use shift or control key to make multiple selections.)

State/Province: (e.g. Alabama)

And ☐ **/ Or** ☒ **non-native distribution:**

Additional criteria to limit search:

Restrict crops maintained at these NPGS repositories: ALL
 BRW
 CLO
 COR
 COT

(Use shift or control key to make multiple selections.)

Restrict to names with germplasm in NPGS ☐

Restrict to names without germplasm in NPGS ☐

Selections

Crop: ALFALFA

(reviewed by Dr. Stephanie L. Greene, Geneticist/Curator, USDA/ARS, National Temperate Forage Legume Genetic Resources Unit, Prosser, Washington on 16 January 2009)

Crop taxa:

1. [*Medicago sativa* L. subsp. *sativa*](#) – alfalfa — [3240 accessions \[434 wild & 664 landraces\]](#) (DLEG-1, NSSL-299, W6-2940) in NPGS, landraces from Azerbaijan: [1](#)
2. [*Medicago sativa* L. nothosubsp. *varia* \(Martyn\) Arcang.](#) – variegated alfalfa — [328 accessions \[121 wild & 62 landraces\]](#) (NSSL-1, W6-327) in NPGS, no landraces from Azerbaijan
3. [*Medicago sativa* L. subsp. *falcata* \(L.\) Arcang.](#) – sickle alfalfa — [483 accessions \[362 wild & 12 landraces\]](#) (NSSL-4, W6-479) in NPGS, no landraces from Azerbaijan

Crop wild relatives:**Primary**

1. [*Medicago sativa* subsp. *falcata* \(L.\) Arcang.](#) — [\[References\]](#) — [483 accessions \[362 wild + 12 landraces + 14 breeding + 23 cultivars + 53 cultivated + 16 uncertain\]](#) (NSSL-4, W6-479) in NPGS, no wild from Azerbaijan
2. [*Medicago sativa* subsp. *glomerata* \(Balb.\) Rouy](#) — [\[References\]](#) — [11 accessions \[7 wild + 2 cultivated\]](#) (W6) in NPGS, no wild from Azerbaijan

Crop: BARLEY

(reviewed by Dr. Harold E. Bockelman, Supervisory Agronomist & Curator, USDA/ARS, National Small Grains Collection, Aberdeen, Idaho on 13 September 2010)

Crop taxon:

1. [*Hordeum vulgare* L. subsp. *vulgare*](#) – barley — [31758 accessions \[13135 landraces\]](#) (NGRL-2, NSGC-31010, NSSL-746) in NPGS, landraces from Azerbaijan: [92](#)

Crop wild relatives:**Primary**

1. [*Hordeum vulgare* subsp. *spontaneum* \(K. Koch\) Thell.](#) — [\[References\]](#) — [1512 accessions \[1510 wild + 2 breeding\]](#) (NSGC-1510, NSSL-2) in NPGS, wild from Azerbaijan: [2](#)

Crop: CARROT

(according to Dr. David M. Spooner, USDA/ARS, Department of Horticulture, University of Wisconsin, Madison, Wisconsin, on 10 September 2010, this classification can only be tentative, as species and generic relationships in this group remain to be elucidated)

Crop taxa:

1. [*Daucus carota* L. subsp. *sativus* \(Hoffm.\) Arcang. var. *sativus* Hoffm.](#) – carrot — [99 accessions \[23 landraces\]](#) (NC7) in NPGS, no landraces from Azerbaijan
2. [*Daucus carota* L. subsp. *sativus* \(Hoffm.\) Arcang. var. *atrorubens* Alef.](#) – purple carrot — [2 accessions](#) (NC7) in NPGS, no landraces from Azerbaijan

Crop wild relatives:**Primary**

1. [*Daucus carota* subsp. *carota*](#) — [\[References\]](#) — [91 accessions \[66 wild + 1 landrace + 11 cultivars + 1 cultivated + 1 uncertain\]](#) (NC7) in NPGS, no wild from Azerbaijan

Crop: GRAPE, WINE**Crop taxon:**

1. [*Vitis vinifera* L. subsp. *vinifera*](#) – wine grape — [1283 accessions \[51 wild\]](#) (DAV-1200, GEN-83) in NPGS, no landraces from Azerbaijan

Crop wild relatives:**Primary**

1. [*Vitis vinifera* subsp. *sylvestris* \(C. C. Gmel.\) Hegi](#) — [\[References\]](#) — [79 accessions \[67 wild + 1 breeding + 9 cultivated + 1 uncertain\]](#) (DAV-78, GEN-1) in NPGS, wild from Azerbaijan: [33](#)

Crop: LEEK**Crop taxon:**

submit query

clear form

Check wild origin data against known wild range: ☒

Crop:

RADISH — *Raphanus sativus*
 RAPE — *Brassica napus*
 RICE — *Oryza sativa*
 SORGHUM — *Sorghum bicolor*
 SOYBEAN — *Glycine max*
STRAWBERRY — *Fragaria ananassa*
 SUGARBEET — *Beta vulgaris*
 SUGARCANE — *Saccharum officinarum*
 SUNFLOWER — *Helianthus annuus*
 TOBACCO — *Nicotiana tabacum*

(Use shift or control key to make multiple selections.)

Genus name: (e.g. *Oryza* [without author])

Genetic relative status: ☒ primary ☒ secondary ☒ tertiary ☒ graftstock

Family(ies):

ALL FAMILIES
 all pteridophytes
 all gymnosperms
 all angiosperms
 Actinidiaceae

(Use shift or control key to make multiple selections.)

Native distribution:

Continent: ALL CONTINENTS

Region: ALL REGIONS

Country(ies):

ALL COUNTRIES
 Afghanistan
 Albania
 Algeria
 Andorra

(Use shift or control key to make multiple selections.)

State/Province: (e.g. Alabama)

And ☐ / Or ☒ non-native distribution:

Additional criteria to limit search:

Restrict to crops maintained at these NPGS repositories

ALL
 BRW
 CLO
 COR
 COT

(Use shift or control key to make multiple selections.)

Restrict to names with germplasm in NPGS ☐

Restrict to names without germplasm in NPGS ☐

Selections

Crop wild relatives:

Primary

1. *Fragaria chiloensis* (L.) Mill. — [References] — 130 accessions [12 wild + 111 breeding + 2 cultivars + 5 cultivated] (COR) in NPGS, wild from Canada: 2, Chile: 2, Ecuador: 2, United States: 6
2. *Fragaria chiloensis* f. *chiloensis* — [References] — 16 accessions [0 wild + 1 landrace + 15 breeding] (COR) in NPGS
3. *Fragaria chiloensis* subsp. *lucida* (E. Vilm. ex Gay) Staudt — [References] — 13 accessions [2 wild + 11 breeding] (COR) in NPGS, wild from United States: 2
4. *Fragaria chiloensis* subsp. *pacifica* Staudt — [References] — 27 accessions [12 wild + 13 breeding + 2 cultivated] (COR) in NPGS, wild from United States: 12
5. *Fragaria chiloensis* f. *patagonica* Staudt — [References] — 194 accessions [1 wild + 182 breeding + 11 cultivated] (COR) in NPGS, wild from Argentina: 1
6. *Fragaria chiloensis* subsp. *sandwicensis* (Decne.) Staudt — [References] — 2 accessions [all wild] (COR) in NPGS, wild from United States: 2
7. *Fragaria virginiana* Mill. — [References] — 270 accessions [257 wild + 3 breeding + 8 cultivars + 2 cultivated] (COR) in NPGS, wild from Canada: 2, United States: 255
8. *Fragaria virginiana* subsp. *glauca* (S. Watson) Staudt — [References] — 44 accessions [40 wild + 2 breeding + 1 cultivar + 4 cultivated] (COR) in NPGS, wild from Canada: 4, United States: 36
9. *Fragaria virginiana* subsp. *grayana* (Vilm. ex J. Gay) Staudt — [References] — 45 accessions [36 wild + 9 breeding] (COR) in NPGS, wild from United States: 36
10. *Fragaria virginiana* subsp. *platypetala* (Rydb.) Staudt — [References] — 65 accessions [62 wild + 3 breeding] (COR) in NPGS, wild from Canada: 2, United States: 60
11. *Fragaria virginiana* subsp. *virginiana* — [References] — 46 accessions [24 wild + 14 breeding + 8 cultivated] (COR) in NPGS, wild from Canada: 3, United States: 21

Secondary

1. *Fragaria iturupensis* Staudt — [References] — 1 accession [all wild] (COR) in NPGS, wild from Russian Federation: 1

Tertiary

1. *Fragaria bucharica* Losinsk. — [References] — 3 accessions [1 wild + 2 cultivars] (COR) in NPGS, wild from Pakistan: 1
2. *Fragaria chinensis* Losinsk. — [References] — 2 accessions [1 wild + 1 cultivar] (COR) in NPGS, wild from China: 1
3. *Fragaria daltoniana* J. Gay — [References] — 2 accessions [0 wild + 1 cultivar + 1 cultivated] (COR) in NPGS
4. *Fragaria inumae* Makino — [References] — 24 accessions [21 wild + 3 cultivated] (COR) in NPGS, wild from Japan: 20, Russian Federation: 1
5. *Fragaria mandshurica* Staudt — [References] — 1 accession [all wild] (COR) in NPGS, wild from United States: 1
6. *Fragaria moschata* Weston — [References] — 13 accessions [4 wild + 1 breeding + 7 cultivars + 1 cultivated] (COR) in NPGS, wild from Germany: 3, Russian Federation: 1
7. *Fragaria moupinensis* (Franch.) Cardot — [References] — 1 accession [0 wild + 1 cultivar] (COR) in NPGS
8. *Fragaria nilgerrensis* Schtdl. ex J. Gay — [References] — 7 accessions [4 wild + 3 cultivated] (COR) in NPGS, wild from China: 4
9. *Fragaria nilgerrensis* subsp. *hayatae* (Makino) Staudt — [References] — 0 accessions in NPGS
10. *Fragaria nilgerrensis* var. *mairei* (H. Lev.) Hand.-Mazz. — [References] — 0 accessions in NPGS
11. *Fragaria nilgerrensis* subsp. *nilgerrensis* — [References] — 0 accessions in NPGS
12. *Fragaria nipponica* Makino — [References] — 11 accessions [8 wild + 3 cultivated] (COR) in NPGS, wild from Japan: 7, Russian Federation: 1
13. *Fragaria nipponica* subsp. *chejuensis* Staudt & Olbricht — [References] — 0 accessions in NPGS
14. *Fragaria nipponica* subsp. *nipponica* — [References] — 0 accessions in NPGS
15. *Fragaria nipponica* subsp. *yakusimensis* (Masam.) Staudt & Olbricht — [References] — 0 accessions in NPGS
16. *Fragaria nubicola* (Hook. f.) Lindl. ex Lacaita — [References] — 2 accessions [all wild] (COR) in NPGS, wild from Nepal: 1, Pakistan: 1
17. *Fragaria orientalis* Losinsk. — [References] — 15 accessions [10 wild + 3 cultivars + 2 cultivated] (COR) in NPGS, wild from China: 3, Russian Federation: 7
18. *Fragaria tibetica* Staudt & Dickore — [References] — 1 accession [0 wild + 1 cultivar] (COR) in NPGS
19. *Fragaria vesca* L. — [References] — 50 accessions [33 wild + 2 breeding + 12 cultivars + 3 cultivated + 1 uncertain] (COR) in NPGS, wild from Armenia: 1, Bolivia: 1, Bulgaria: 6, Canada: 1, Finland: 1, Germany: 2, Italy: 1, Japan: 2, Kazakhstan: 3, Poland: 1, Russian Federation: 3, Ukraine: 1, United States: 10
20. *Fragaria vesca* f. *alba* (Ehrh.) Staudt — [References] — 8 accessions [4 wild + 4 cultivated] (COR) in NPGS, wild from Sweden: 1, United States: 3
21. *Fragaria vesca* f. *albida* Staudt — [References] — 0 accessions in NPGS
22. *Fragaria vesca* subsp. *americana* (Porter) Staudt — [References] — 14 accessions [4 wild + 10 breeding] (COR) in NPGS, wild from United States: 4
23. *Fragaria vesca* f. *bracteata* (A. Heller) Staudt — [References] — 1 accession [0 wild + 1 cultivated] (COR) in NPGS
24. *Fragaria vesca* subsp. *bracteata* (A. Heller) Staudt — [References] — 40 accessions [39 wild + 1 breeding] (COR) in NPGS, wild from Canada: 1, United States: 38
25. *Fragaria vesca* subsp. *californica* (Cham. & Schtdl.) Staudt — [References] — 4 accessions [0 wild + 3 breeding + 1 cultivated] (COR) in NPGS
26. *Fragaria vesca* f. *helleri* (Holz.) Staudt — [References] — 0 accessions in NPGS
27. *Fragaria vesca* f. *roseiflora* (Boulay) Staudt — [References] — 1 accession [0 wild + 1 breeding] (COR) in NPGS
28. *Fragaria vesca* f. *semperflorens* (Duchesne) Staudt — [References] — 15 accessions [1 wild + 9 breeding + 5 cultivars] (COR) in NPGS, wild from Kyrgyzstan: 1
29. *Fragaria vesca* subsp. *vesca* — [References] — 18 accessions [10 wild + 5 breeding + 2 cultivars + 1 cultivated] (COR) in NPGS, wild from Canada: 2, Ecuador: 1, Finland: 1, Germany: 1, Mexico: 1, Sweden: 1, United States: 1
30. *Fragaria viridis* Weston — [References] — 10 accessions [6 wild + 4 breeding] (COR) in NPGS, wild from Germany: 4, Russian Federation: 1, Sweden: 1

Accessions with
passport data
incongruent with
distribution data

GRIN CWR Data



Dr. Blanca León

<http://www.ars-grin.gov/~sbmljw/cgi-bin/taxcwr.pl>

<http://www.ars-grin.gov/~sbmljw/cgi-bin/taxcrop.pl>